CLAIMS

1. A distillation apparatus for subjecting a crude readily polymerizable compound to distillation under vacuum conditions to purify it, which comprises a distillation column and a vacuum generator and an exhaust gas conduit of the vacuum generator connected to a connecting conduit therebetween through a pressure control valve.

2. The apparatus according to claim 1, which is a distillation apparatus for treating a readily polymerizable compound, wherein the apparatus has a distillation column main body and a reboiler into which a column bottom liquid of the column main body is introduced through an introducing tubular member, the introducing tubular member connecting to the side face of the column main body.

3. The apparatus according to claim 1 or 2, wherein a perforated tray in which a number of pores penetrating from the upper face of a tray to the back face thereof are provided, and a surrounding projection wall hanging down from the back face of the tray is provided in the outer periphery of the lower end of the pore is used.

4. The apparatus according to any one of claims 1 to 3, wherein the vacuum generator is a steam driving type

ejector, and the readily polymerizable compound is (meth)acrylic acid.

5. A method of purifying of a readily polymerizable compound by subjecting a crude readily polymerizable compound to distillation under vacuum conditions to purify it, which comprises using a distillation apparatus comprising a distillation column and a vacuum generator and an exhaust gas conduit of the vacuum generator connected to a connecting conduit therebetween through a pressure control valve and controlling the action of the pressure control valve based on a pressure of the distillation column, thereby controlling the amount of the exhaust gas to be introduced to control the pressure of the distillation column.

6. The method according to claim 5, which is a method of purifying (meth)acrylic acid using a distillation column in which at least a part of trays is a weir-free perforated tray, wherein openings of the weir-free perforated tray are positioned on respective intersections of an oblique lattice comprising a first group of lines aligned in parallel and at even intervals and a second group of lines oblique to the first group of lines and aligned in parallel and at even intervals; with respect to a local opening rate (B/A) that is a ratio of a sum B of areas of openings of a

region comprising of a parallelogram surrounded by the oblique lattice to an area A of the region and a ratio u/S of a total area u of all of the openings to a column sectional area S, a value of (u/S)/(B/A) ratio is 0.67 or more; the flow rate dropping along an edge of the opening is 0.035 $m^3/m \cdot h$ or more; the distillation column has a column diameter of 1.2 m or more; and an oxygen concentration in a gas within the column is from 0.008 to 0.1 % by mole.

7. The method according to claim 5 or 6, including steps of a collection step of absorbing a (meth)acrylic acid from a reaction product gas obtained by vapor catalytic oxidation reaction into an aqueous absorbing liquid, a preliminary purification step of removing the absorbing liquid and impurities from the resulting (meth)acrylic acid solution to obtain crude (meth)acryl, and a purification step of including distillation of (meth)acrylic acid, wherein a polymerization inhibitor solution is prepared using waste water containing (meth)acrylic acid generated in a vacuum source of the distillation apparatus provided in the preliminary purification step and/or purification step and then fed into the collection step or subsequent steps thereto.

8. Column equipment for treating a readily polymerizable

compound having a column main body and a reboiler into which a column bottom liquid of the column main body is introduced through an introducing tubular member, the column equipment for the readily polymerizable compound being characterized in that the introducing tubular member connects to the side face of the column main body.

9. The column equipment according to claim 8, wherein the column main body is provided with a pot part projecting downward in the lower end thereof, and the introducing tubular member connects to the side face of the pot part.

10. The column equipment according to claim 8, wherein a tubular member for discharging a column bottom liquid is projected downward from the lower end of the column main body, and the introducing tubular member connects to the side face of the discharging tubular member.

11. The column equipment according to claim 10, wherein a ratio (a/b) of a pipe size a of the discharging tubular member to a pipe size b of the introducing tubular member is 0.5 or more.

12. The column equipment according to any one of claims 8 to 11, wherein the vicinity of the upstream end of the introducing tubular member is horizontal or ascends toward

the downstream side.

13. A method of distilling (meth)acrylic acid by distilling a (meth)acrylic acid solution using a distillation column in which at least a part of trays is a weir-free perforated tray, wherein openings of the weir-free perforated tray are positioned on respective intersections of an oblique lattice comprising a first group of lines aligned in parallel and at even intervals and a second group of lines oblique to the first group of lines and aligned in parallel and at even intervals; with respect to a local opening rate (B/A) that is a ratio of a sum B of areas of openings of a region comprising of a parallelogram surrounded by the oblique lattice to an area A of the region and a ratio u/S of a total area u of all of the openings to a column sectional area S, a value of (u/S)/(B/A) ratio is 0.67 or more; the flow rate dropping along an edge of the opening is 0.035 $m^3/m \cdot h$ or more; the distillation column has a column diameter of 1.2 m or more; and an oxygen concentration in a gas within the column is from 0.008 to 0.1 % by mole.

14. The method according to claim 13, wherein the opening is a circle having a diameter of from 10 to 30 mm, and when an interval of the first group of lines is defined as p1, an interval of the second group of lines is defined as p2,

and an internal angle taken by the first group of lines and the second group of lines is defined as θ, relationships of ($1 \leq p2/p1 \leq 2$) and {$\cos - 1(p2/2p1) \leq \theta \leq \pi/2$} (wherein $\theta \geq \pi/4$) are satisfied.

15. The method according to claim 13 or 14, wherein the value of (B/A) is from 0.17 to 0.28, and the value of (u/S)/(B/A) is from 0.67 to 0.90.

16. A process of producing (meth)acrylic acid through respective steps of a collection step of bringing a reaction product gas containing (meth)acrylic acid obtained by vapor catalytic oxidation reaction into contact with an aqueous absorbing liquid to absorb the (meth)acrylic acid in the gas into the absorbing liquid, a preliminary purification step of removing the absorbing liquid and impurities from the resulting (meth)acrylic acid solution to obtain crude (meth)acryl, and a purification step of obtaining purified (meth)acryl from the crude (meth)acrylic acid by purification including distillation of (meth)acrylic acid by vacuum distillation, the process being characterized in that a polymerization inhibitor solution is prepared using waste water containing (meth)acrylic acid generated in a vacuum source in the preliminary purification step and/or purification step and then fed into the collection step or subsequent steps

thereto.

17. The process according to claim 16, wherein waste water generated in a vacuum source of a vacuum distillation column for distilling (meth)acrylic acid purified by vacuum distillation is used as the waste water containing (meth)acrylic acid generated in the vacuum source in the purification step.

18. The process according to claim 16 or 17, wherein the vacuum source is a steam ejector.

19. A perforated tray for distillation column, wherein a number of pores penetrating from the upper face of a tray to the back face thereof are provided, and a surrounding projection wall hanging down from the back face of the tray is provided in the outer periphery of the lower end of the pore.

20. A process of producing a (meth)acrylic acid by using a distillation column including a perforated tray provided with a number of pores penetrating from the upper face of the tray to the back face thereof and with a surrounding projection wall hanging down from the back face of the tray in the outer periphery of the lower end of the pore.